California Energy Commission

ONCE-THROUGH COOLING ISSUES IN COASTAL POWER PLANTS

Rick York, CEC Staff Biologist
Assessments and Siting Division
Environmental Protection Office
(916) 654-3945
ryork@energy.state.ca.us

Once-through Cooling Basics

- Facilities using once-through cooling withdraw cooling water from a nearby open water source such a river, bay, estuary, canal, or an ocean.

- Withdrawal of large volumes of water (ex. Diablo Canyon Nuclear Power Plant is permitted to withdraw up to 2.5 billion gallons per day) affects large quantities of aquatic organisms through *impingement* and *entrainment*.

Impingement = aquatic organisms are *trapped against* components of the cooling water system – usually affects larger organisms such as fish that are trapped against cooling water system structures and either die of starvation or exhaustion

Entrainment = aquatic organisms are *drawn through* the cooling water system – usually kills smaller organisms in early life stages by exposing them to water temperature increase, mechanical damage and/or toxic stress.

2003 Environmental Performance Report Findings

California has:

- 21 coastal power plants with . . .
- 30 cooling water intakes which are . . .
- permitted to withdraw/discharge approximately ~16,700 million gallons per day.

More 2003 Environmental Performance Report Findings

- 14 of 21 power plants (67%) have their intake(s) in either the Sacramento delta, or in a bay, estuary, lagoon, harbor, or immediately adjacent to a shoreline.

- Intakes in these areas, according to federal EPA, are expected to have higher impacts when compared to facilities with open ocean (offshore) intakes, since these areas are more biologically productive and contain more aquatic organisms in early life stages.

- We also reported that new federal Clean Water Act Section 316(b) regulations for existing, large power plants were expected to be published in 2004.

Agency Concerns - Concerned Agencies

- Facilities using once-through cooling can have significant negative effects on aquatic species and their habitat – impacts under CEQA can be ***significant*** and ***adverse*** under the federal Clean Water Act.

- Staff, other state and federal agencies and other stakeholders are concerned about the lack of current impact data for facilities using once-through cooling, and believe coastal power plants may represent a significant cumulative concern affecting coastal species and ecosystems.

- Concerned agencies: California Department of Fish and Game, National Marine Fisheries Service, U. S. Fish and Wildlife Service, Bay Conservation and Development Commission, California Coastal Commission and the Regional Boards

New Federal Clean Water Act
Section 316(b) (Phase II) Regulations

- New federal regulations were published September 2004
- Applies new standards to existing facilities permitted to pump/discharge 50+ million gallons per day – *all California facilities are permitted to pump/discharge 50+ million gallons per day.*
- Requires impingement and entrainment impact analyses
- Requires demonstration of how facility will reduce, or is currently reducing, impingement and entrainment impacts to fish and shellfish by 80 - 95% and 60 - 90%, respectively.
- Administered by Regional Water Quality Control Boards through the National Pollution Discharge Elimination System (NPDES) permit renewal process – permits are renewed every 5 years.

California Environmental Quality Act and Federal Clean Water Act

A distinction between the two Acts:

- New Federal Clean Water Act section 316(b) regulations address NPDES permits for power plant intakes and associated cooling water discharges and focuses primarily on technology improvements to minimize impacts.

- California Energy Commission power plant licenses address all features of the power plants for California Environmental Quality Act and Warren-Alquist Act compliance, including an assessment of once-through cooling impacts to coastal habitats and suitable mitigation.

Once-through Cooling – Staff's 2005 EPR Focus

Staff intends to acquire the following project-specific information from each Regional Board:

- Results of recent impingement and entrainment studies;
- Required changes to cooling water intakes (too lessen impingement);
- Required changes to intake flow velocity (too lessen entrainment);
- Actual amounts of cooling water pumped/discharged per month;
- Whether a new desalination facility was added to the power plant site;
- Whether any coastal power plant stopped using once-through cooling.

Seven Regional Board contacts have already been made, and all have expressed a willingness to answer these questions for the 2005 EPR and future EPRs.

Benefits of Tracking NPDES Permit Renewals, Impact Assessments, and Mitigation Trends for the EPR

- Project-specific information will be useful to staff for power plant siting cases;

- Information gathering will enhance interagency and stakeholder coordination and lead to a better understanding of once-through cooling impacts and possible solutions;

3. Information will also be useful to the Energy Commission's PIER Program's research contract, *Evaluation of the Effects of Cooling Water Intake Structures on Aquatic Ecosystems*, with Moss Landing Marine Laboratory; and

4. Determine if NPDES permit impact mitigation requirements answer Governor Schwarzenegger's **Ocean Action Plan** (September 2004) call to *' . . . increase the abundance and diversity of aquatic life in California's oceans, bays, estuaries and coastal wetlands.'*